DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6/20/08 have been fully considered but they are not persuasive.

The applicant argues on pages 11 of the response in essence that: Takiguchi '681, Sekine '710 and Takiguchi '681 does not disclose blending the results from the first interpolation processing and the second interpolation processing … "when the number of discrete luminance values is larger than a threshold number" beside the requirement as to "luminance value width being in a predetermined range."

a. Takiguchi '681 discloses blending the results from the first interpolation processing and the second interpolation processing (col. 18-19, lines 47-67, 1-17, X_P obtains a value of the possibilities of characters and photographs in the image which falls within 0% to 100%. The variable scaling method used is closer to nearest neighbor interpolation when X_P is small and closer to interpolation of the first degree when X_P is large). Sekine '710 discloses a function of providing a first interpolation processing function and a second interpolation function determined based on the luminance value width being in a predetermined range (col. 9, lines 20-59, calculates the difference between the maximum and minimum of lightness values and compares with a predetermined threshold value. Outputs 1 if the difference is larger than the threshold and outputs 0 if not) when the number of discrete luminance values is larger than a threshold number

(the discrete luminance value must be greater than 0, otherwise the difference between the maximum and minimum cannot be calculated).

Claim Objections

2. Claim 1 is objected to because of the following informalities: On line 6, change "the computer" to "a computer." Appropriate correction is required.

3. Claim 23 is objected to because of the following informalities: On line 28, remove the occurrence of the word "and". Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 12, 23, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekine '710, and further in view of Tanaka '463 and Takiguchi '681.

Referring to **claim 1**, Sekine '710 discloses a computer-readable medium storing an image data interpolation program configured to implement pixel interpolation to add interpolated pixels to image data of an image represented in multi-tone dot matrix pixels by controlling computer reading the image data interpolation program to perform:

a function of image data acquisition that acquires said image data (image memory 1 of Fig. 1, col. 5, lines 1-2);

a function of determining a luminance value width as a difference between a maximum luminance value of the discrete luminance values and a minimum luminance value of the discrete luminance values (col. 9, lines 20-59, calculates the difference between the maximum and minimum of lightness values);

a function of providing a first interpolation processing function, that interpolates pixels to add to said image data without decreasing the tone value difference between the existing pixels (col. 5, lines 31-34, second interpolation component 7 applies nearest neighbor interpolation, col. 7, lines 28-34), and a second interpolation processing function that interpolates pixels to add to said image data without affecting the gradation of the tones of the image (col. 5, lines 31-34, first interpolation component 6 applies bi-linear interpolation, col. 7, lines 34-40) determined based on the luminance value width being in a predetermined range (col. 9, lines 20-59, calculates the difference between the maximum and minimum of lightness values and compares with a predetermined threshold value. Outputs 1 if the difference is larger than the threshold and outputs 0 if not) when the number of discrete luminance values is larger than a threshold number (the discrete luminance value must be greater than 1, otherwise the difference between the maximum and minimum value is less than the threshold value).

Sekine ‘710 does not disclose expressly blending two interpolation processes based on a blending ratio.

Tanaka ‘463 discloses a function of providing a blend of a first interpolation processing function, that interpolates pixels to add said image data without decreasing the degree of tone value difference between the existing pixels (nearest neighbor

interpolation, col. 1, lines 20-27) and a second interpolation processing function that interpolates pixels to said image data without affecting the gradation of the tones of the image (linear interpolation, col. 1, lines 28-42) based on a blending ratio (col. 18-19, lines 47-67, 1-17, X_P obtains a value of the possibilities of characters and photographs in the image which falls within 0% to 100%. The variable scaling method used is closer to nearest neighbor interpolation when X_P is small and closer to interpolation of the first degree when X_P is large).

At the time of the invention, it would have obvious to a person of ordinary skill in the art to blend two interpolation processes based on a blending ratio. The motivation for doing so would have been to prevent deterioration in image quality when interpolated an image that contains characters, photographs, and mesh dots.

Sekine '710 does not disclose expressly determining the number of discrete luminance values by acquiring a histogram.

Takiguchi '681 discloses a function of histogram acquisition that acquires a histogram of a number of discrete luminance values calculated by linearly combining color component brightness values of at least each of reference pixels (col. 12, lines 37-45, a histogram of the luminance of an image is acquired); and

a function of determining the number of discrete luminance values acquired performing the function of histogram acquisition (col. 12, lines 37-45 [creating a luminance histogram requires determining the number of discrete luminance values]).

At the time of the invention, it would have obvious to a person of ordinary skill in the art to determine the number of discrete luminance values by creating a histogram.

The motivation for doing so would have been to accurately determine whether an image was natural or non-natural. Therefore, it would have been obvious to combine Tanaka '463 and Takiguchi '681 with Sekine '710 to obtain the invention as specified in claim 1.

Referring to **claim 12**, see the rejection of claim 1 above.

Referring to **claim 23**, Sekine '710 discloses an image data interpolation apparatus for interpolating pixels to add to image data of an image represented in multi-tone dot matrix pixels comprising:

an image data acquisition unit that acquires said image data (image memory 1 of Fig. 1, col. 5, lines 1-2);

a first interpolation processing unit that performs first interpolation processing to interpolate pixels to add to said image data without decreasing the degree of tone value difference between the existing pixels (col. 5, lines 31-34, second interpolation component 7 applies nearest neighbor interpolation, col. 7, lines 28-34),

a second interpolation process that performs second interpolation processing to interpolate pixels to add to said image data without affecting the gradation of the tones of the image (col. 5, lines 31-34, first interpolation component 6 applies bi-linear interpolation, col. 7, lines 34-40);

a difference determining unit that determines a luminance value width as a difference between a maximum luminance value of the discrete luminance values and a minimum luminance value of the discrete luminance values (min-max calculation component 4 of Fig. 1, col. 9, lines 20-59, calculates the difference between the maximum and minimum of lightness values); and

providing a first interpolation processing and a second interpolation processing determined based on the luminance value width being in a predetermined range (col. 9, lines 20-59, calculates the difference between the maximum and minimum of lightness values and compares with a predetermined threshold value. Outputs 1 if the difference is larger than the threshold and outputs 0 if not) when the number of discrete luminance values is larger than a threshold number (the discrete luminance value must be greater than 1, otherwise the difference between the maximum and minimum value is less than the threshold value).

Sekine '710 does not disclose expressly blending two interpolation processes based on a blending ratio.

Tanaka '463 discloses an interpolation blending unit (variable scaling section 4 of Fig. 1, col. 11-12, lines 63-67, 1-15) that blends results from the first interpolation processing and the second interpolation processing based on a blending ratio (col. 18-19, lines 47-67, 1-17, X_P obtains a value of the possibilities of characters and photographs in the image which falls within 0% to 100%. The variable scaling method used is closer to nearest neighbor interpolation when X_P is small and closer to interpolation of the first degree when X_P is large).

At the time of the invention, it would have obvious to a person of ordinary skill in the art to blend two interpolation processes based on a blending ratio. The motivation for doing so would have been to prevent deterioration in image quality when interpolated an image that contains characters, photographs, and mesh dots.

Sekine ‘710 does not disclose expressly determining the number of discrete luminance values by acquiring a histogram.

Takiguchi ‘681 discloses a histogram acquisition unit that acquires a histogram of a number of discrete luminance values calculated by linearly combining color component brightness values of at least each oft-he a set of reference pixels (panoramic image synthesization unit 517 of Fig. 5, col. 12, lines 37-45, a histogram of the luminance of an image is acquired); and

a determining unit that determines the number of discrete luminance values acquired performing the function of histogram acquisition (panoramic image synthesization unit 517 of Fig. 5, col. 12, lines 37-45 [creating a luminance histogram requires determining the number of discrete luminance values]).

At the time of the invention, it would have obvious to a person of ordinary skill in the art to determine the number of discrete luminance values by creating a histogram. The motivation for doing so would have been to accurately determine whether an image was natural or non-natural. Therefore, it would have been obvious to combine Tanaka ‘463 and Takiguchi ‘681 with Sekine ‘710 to obtain the invention as specified in claim 23.

Referring to **claim 34**, Sekine ‘710 discloses a function of performing only the first interpolation processing when the number of discrete luminance values is smaller than the threshold number (col. 9-10, lines 48-59, 18-34, selects bilinear interpolation when the difference between the maximum and minimum values is less than the threshold value [when the discrete luminance value = 1]).

Referring to **claim 36**, Sekine '710 discloses a function of performing only the second interpolation processing when the number of discrete luminance values is larger than the threshold number and the luminance value width has a smaller value than a minimum value of said predetermined range col. 9-10, lines 48-59, 18-34, selects nearest neighbor interpolation when greater than the threshold value [when the discrete luminance value is more than 1]).

Referring to **claim 37**, Tanaka '463 discloses a function of setting the blending ratio to a constant value (col. 13, lines 38-58, performs only interpolation of the first degree when X_P is large)

Sekine '710 discloses performing a second interpolation processing function when the number of discrete luminance values is larger than the threshold number and the luminance value width has a larger value than a maximum value of said predetermined range (col. 9-10, lines 48-59, 18-34, selects nearest neighbor interpolation when greater than the threshold value).

Referring to **claim 38**, Tanaka '463 discloses wherein the constant value of the blending ratio is set so that only the first interpolation processing function is provided (col. 13, lines 38-58, performs only nearest neighbor interpolation when X_P is small).

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter K. Huntsinger whose telephone number is (571)272-7435. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Moore can be reached on (571)-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Peter K. Huntsinger/
Examiner, Art Unit 2625

/David K Moore/
Supervisory Patent Examiner, Art Unit 2625